



**State of Louisiana
Department of Natural Resources
Coastal Restoration Division and
Coastal Engineering Division**

**2005 Operations, Maintenance,
and Monitoring Report**

for

Perry Ridge Shore Protection

State Project Number CS-24
Priority Project List 4

June 2005
Calcasieu Parish

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for
Perry Ridge Shore Protection (CS-24)

Table of Contents

I. Introduction.....	1
II. Maintenance Activity.....	3
a. Project Feature Inspection Procedures	3
b. Inspection Results	3
c. Maintenance Recommendations	3
i. Immediate/Emergency Repairs.....	3
ii. Programmatic/Routine Repairs.....	4
d. Maintenance History.....	4
III. Operation Activity	4
a. Operation Plan.....	4
b. Actual Operations	4
IV. Monitoring Activity	5
a. Monitoring Goals	5
b. Monitoring Elements	5
c. Preliminary Monitoring Results and Discussion	6
V. Conclusions.....	12
a. Project Effectiveness.....	12
b. Recommended Improvements	12
c. Lessons Learned.....	12
VI. References.....	13
VII. Appendices	
a. Appendix A (Inspection Photographs)	
b. Appendix B (Three-Year Budget Projection)	
c. Appendix C (Field Inspection Notes)	



Preface

The Operations, Maintenance, and Monitoring (OM&M) Report format is a streamlined approach which combines the Operations and Maintenance annual project inspection information with the Monitoring data and analyses on a project-specific basis. This report includes monitoring data collected through December 2004, and annual Maintenance Inspections through June 2005.

The 2005 report is the second in a series of reports. For additional information on lessons learned, recommendations and project effectiveness, please refer to the 2004 Operations, Maintenance, and Monitoring Report on the Louisiana Department of Natural Resources (LDNR) web site at dnr.louisiana.gov (Mouledous and Guidry 2007).



I. Introduction

The Perry Ridge Shore Protection project provides features to protect 1,203 ac (481 ha) of vegetated shoreline along the Gulf Intracoastal Waterway (GIWW), which in turn will benefit 5,945 ac (2,378 ha) of predominantly intermediate marsh located north of the shoreline (figure 1). The project is located in Calcasieu Parish, Louisiana, in the Calcasieu-Sabine Basin of Region 4 of the Coast 2050 Plan (Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority 1998). The project extends along the north bank of the GIWW from Perry Ridge to the Vinton Drainage Canal, and is bounded on the north by an arbitrary line connecting the north tip of Big Island and the Gray Canal, on the south by the GIWW, on the east by the Vinton Drainage Canal and the Gray Canal, and on the west by Perry Ridge and Big Island.

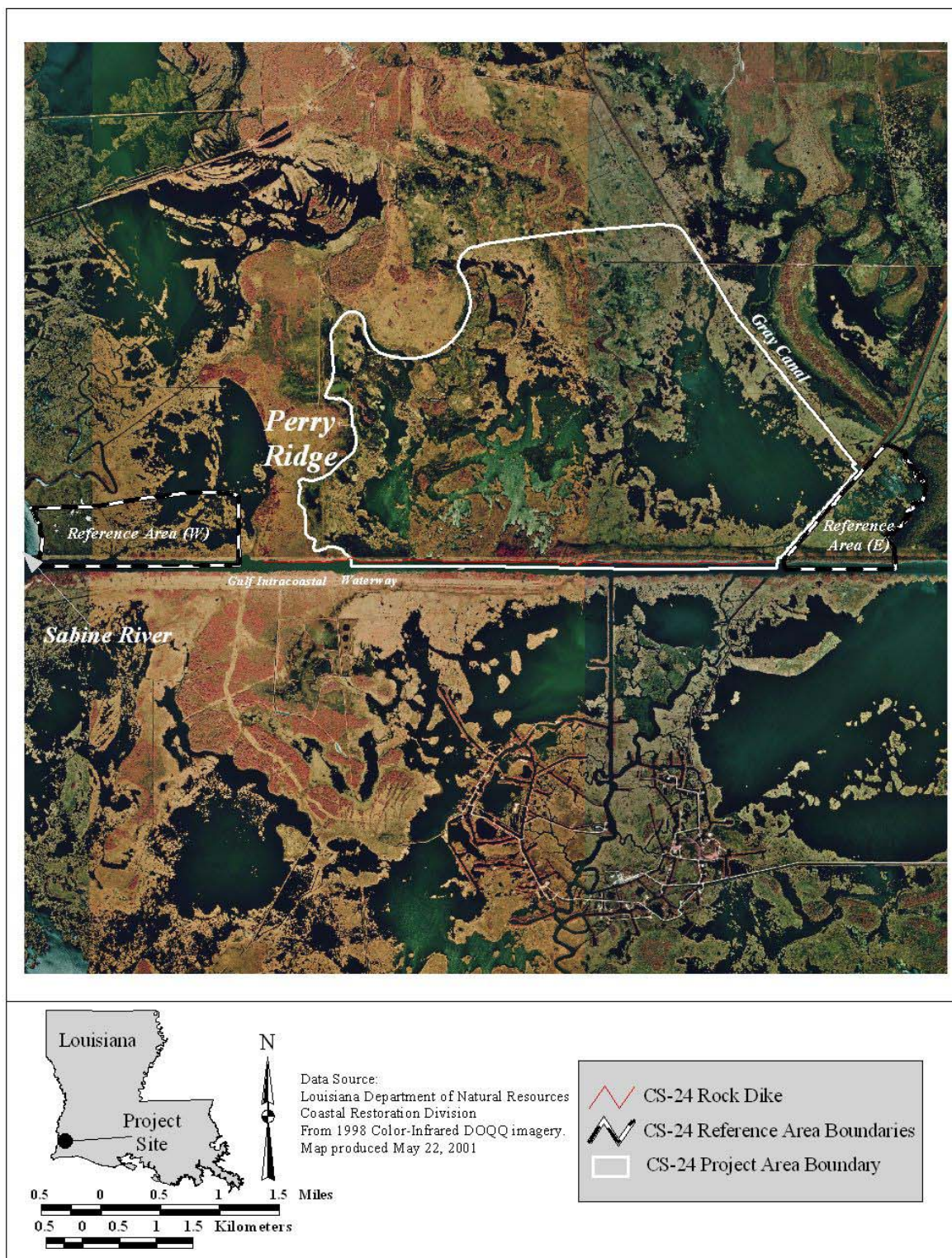
The major problem in this region is marsh erosion caused by saltwater intrusion, rapid water level fluctuation, and wave action (U.S. Department of Agriculture, Soil Conservation Service [USDA/SCS] 1988). Marsh loss in the vicinity of Perry Ridge has been caused by water level fluctuations and tidal scour resulting from water exchange through breaches in the northern spoil bank and the GIWW (U.S. Department of Agriculture, Natural Resources Conservation Service [USDA/NRCS] 1996).

The shoreline erosion rate of the north bank of the GIWW in the vicinity of the project area is 10 ft/yr (3.05 m/yr), based on aerial photography (USDA/SCS 1992). Several factors contribute to the erosion rate. Double-wide barges, allowed in this section of the GIWW, cause more wake energy to reach the bank. The construction of the Calcasieu Ship Channel, deepening of Sabine Pass, the construction of the Sabine-Neches waterway, and the removal of the bar at the mouth of the Calcasieu River have all resulted in increased water currents in the GIWW. The construction of the GIWW has shifted the project area from an essentially non-tidal system to a tidally influenced system.

The 30 ft (9.1 m) depth of the GIWW allows a very large exchange of water, allowing higher salinities to reach the Perry Ridge area faster than was possible before the GIWW's construction. Historically, the project area consisted of freshwater wetlands (USDA/NRCS 1996). More recently, Chabreck, Linscombe, and others classified this area as an intermediate marsh (Chabreck et al. 1968; Chabreck and Linscombe 1978, 1988).

Approximately 23,300 linear ft (7.1 km) of free-standing rock dike was constructed along the north bank of the GIWW from west of Perry Ridge to the Vinton Drainage Canal. Construction of the project was completed in February 1999.





II. Maintenance Activity

a. Project Feature Inspection Procedures

The purpose of the annual inspection of the Perry Ridge Shore Protection Project (CS-24) is to evaluate the project features and identify any deficiencies. Information from the inspection will be used to prepare a report detailing the condition of project features and any corrective actions recommended. Should it be determined that corrective actions are needed, LDNR shall provide, in the report, a detailed cost estimate for engineering, design, supervision, inspection, and construction contingencies, and an assessment of the urgency of such repairs. The annual inspection report also contains a summary of maintenance projects which were completed since completion of constructed project features, and an estimated projected budget for the upcoming three (3) years for operation, maintenance and rehabilitation. Photographs taken during the annual inspection are displayed in Appendix A. The three-year projected operation and maintenance budget is shown in Appendix B.

An annual O & M inspection of the Perry Ridge Shore Protection Project (CS-24) was held on April 8, 2005, under partly cloudy skies and warm temperatures. In attendance were Mel Guidry, Pat Landry, Stan Aucoin, and Darrell Pontiff of LDNR, along with Brad Sticker representing NRCS. The annual inspection began on the east side of the project area near its convergence with the Vinton Canal and concluded at the project's western limits.

The field inspection included a complete visual inspection of the entire project site. Staff gauge readings and existing temporary benchmarks were used to determine approximate water elevation and existing elevation of the foreshore rock dike. Photographs were taken of the foreshore rock dike (see Appendix A), and Field Inspection notes were completed in the field to record measurements and deficiencies (see Appendix C).

b. Inspection Results

Site 1—Foreshore Rock Dike:

The dike is in good condition. There is no apparent need for any maintenance at this time. A staff gauge is required in the eastern limits of the project in the Vinton Drainage Canal.

c. Maintenance Recommendations

i. Immediate/ Emergency Repairs

None



II. Maintenance Activity (continued)

ii. Programmatic/ Routine Repairs

None

d. Maintenance History

There has been no maintenance on this project.

III. Operation Activity

a. Operation Plan

There are no water control structures associated with this project, therefore no Structural Operation Plan is required.

b. Actual Operations

There are no water control structures associated with this project, therefore no required structural operations.



IV. Monitoring Activity

Pursuant to a Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) Task Force decision on August 14, 2003, to adopt the Coastwide Reference Monitoring System-*Wetlands* (CRMS-*Wetlands*) for CWPPRA, updates were made to the CS-24 Monitoring Plan to merge it with CRMS-*Wetlands* and provide more useful information for modeling efforts and future project planning while maintaining the monitoring mandates of the Breaux Act.

a. Monitoring Goals

The objectives of the Perry Ridge Shore Protection Project are:

1. Protect the existing emergent wetlands along the north bank of the GIWW and prevent their further deterioration from shoreline erosion and tidal scour.
2. Prevent the widening of the GIWW into the project area wetlands.
3. Reduce the occurrence of salinity spikes within the project area.

The following goals will contribute to the evaluation of the above objectives:

1. Decrease the rate of shoreline erosion along the north bank of the GIWW using a rock dike.

b. Monitoring Elements

Aerial Photography:

To document shoreline position, and land and water areas along the GIWW in the project and reference areas, near-vertical, color-infrared aerial photography (1:12,000 scale, with ground controls) was obtained once prior to construction in 1997, and in post-construction 2001. The original photography was checked for flight accuracy, color correctness, and clarity and was subsequently archived. Aerial photography was scanned, mosaicked, and georectified by U.S. Geological Survey/National Wetlands Research Center (USGS/NWRC) personnel according to standard operating procedures (Steyer et al. 1995, revised 2000). No additional land-water photography will be collected.

Shoreline Change:

To document changes in shoreline position along the GIWW, shoreline markers were placed at 12 points along the vegetated marsh edge adjacent to the rock breakwater. Twelve transects were measured and differentiated by shoreline type in the project and reference areas (minimum of 3 total but not to exceed 1 per 1,000 ft [305 m]). On each transect, a PVC pole was installed to mark the vegetated edge of the bank (VEB), and a post was installed at the end point in the marsh or on the spoil bank to establish a hub for use in relocating each transect. Shoreline position relative to the shoreline markers along the transects was



documented at the same time of the year, once as-built in 1999, and post-construction in 2001 and 2004. Shoreline change will be documented in 2007, 2010, 2013, and 2016.

Salinity:

Salinity measurements were recommended to be collected for one year after the next significant drought after 1996 to determine the rock dike's effect on salinity spikes in the project area behind the dike. Salinity data were collected in 2000 following the drought of 1999.

c. Preliminary Monitoring Results and Discussion

Aerial Photography:

Pre-construction photography, flown on November 23, 1997, indicated that the project area was 60.4% land and 39.6% water (figures 2 and 3). Aerial photography flown on November 17, 2001, documented 65.4% land and 34.6% water in the project area. The higher land to water ratio indicates that the interior marsh has been expanding behind the protected shoreline. In areas without shoreline protection, the land to water ratio continues to decrease.

Shoreline Position:

Shoreline data were collected July 21, 2004 (figure 4). The data indicate that the majority of monitoring stations along the shoreline in the project area have prograded while the shoreline position at all reference sites continued to retreat (Table 1, figure 5).

Salinity:

No new data were collected in 2004.



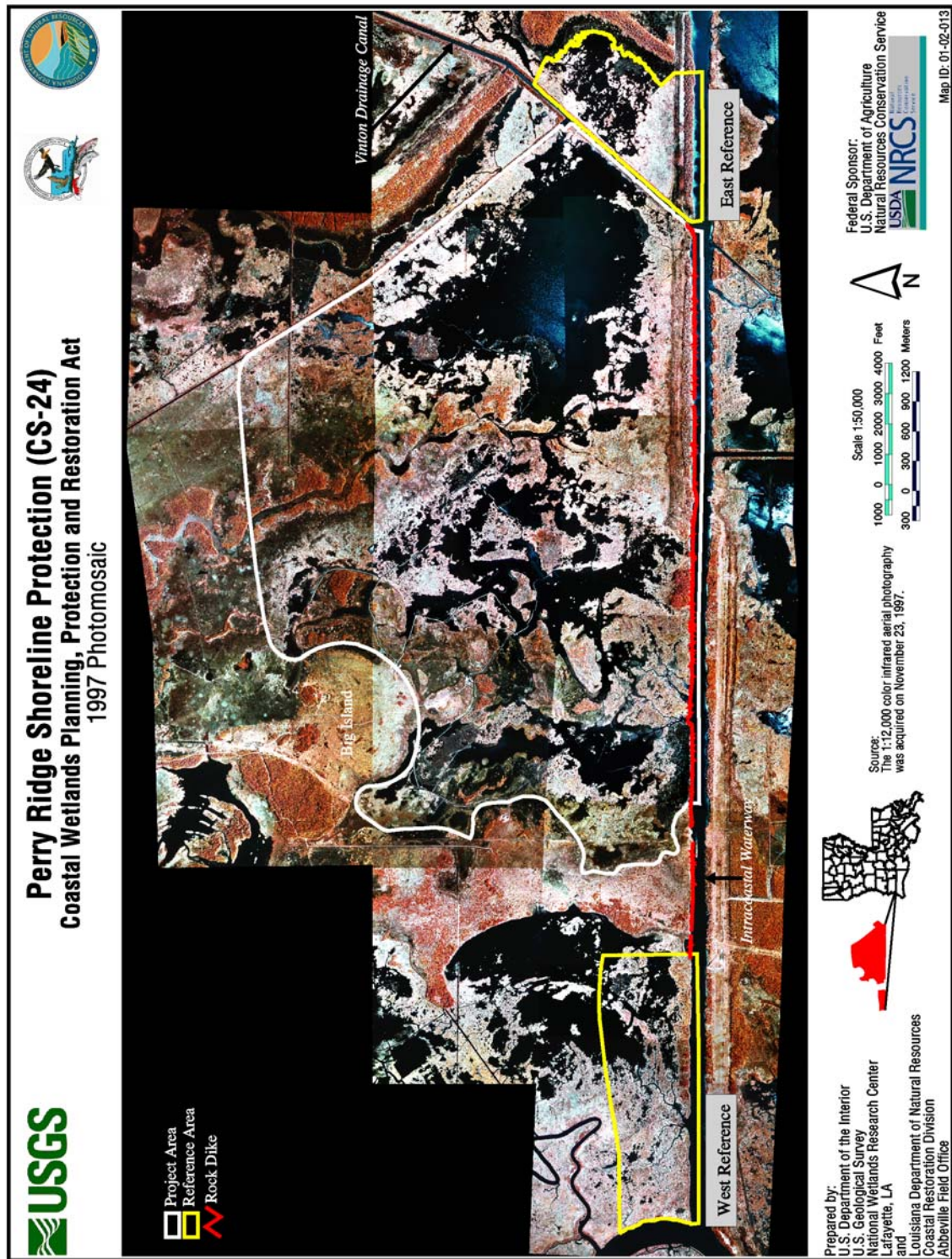


Figure 2. Photomosaic of the Perry Ridge Shore Protection (CS-24) project and reference areas from aerial photography flown November 23, 1997.

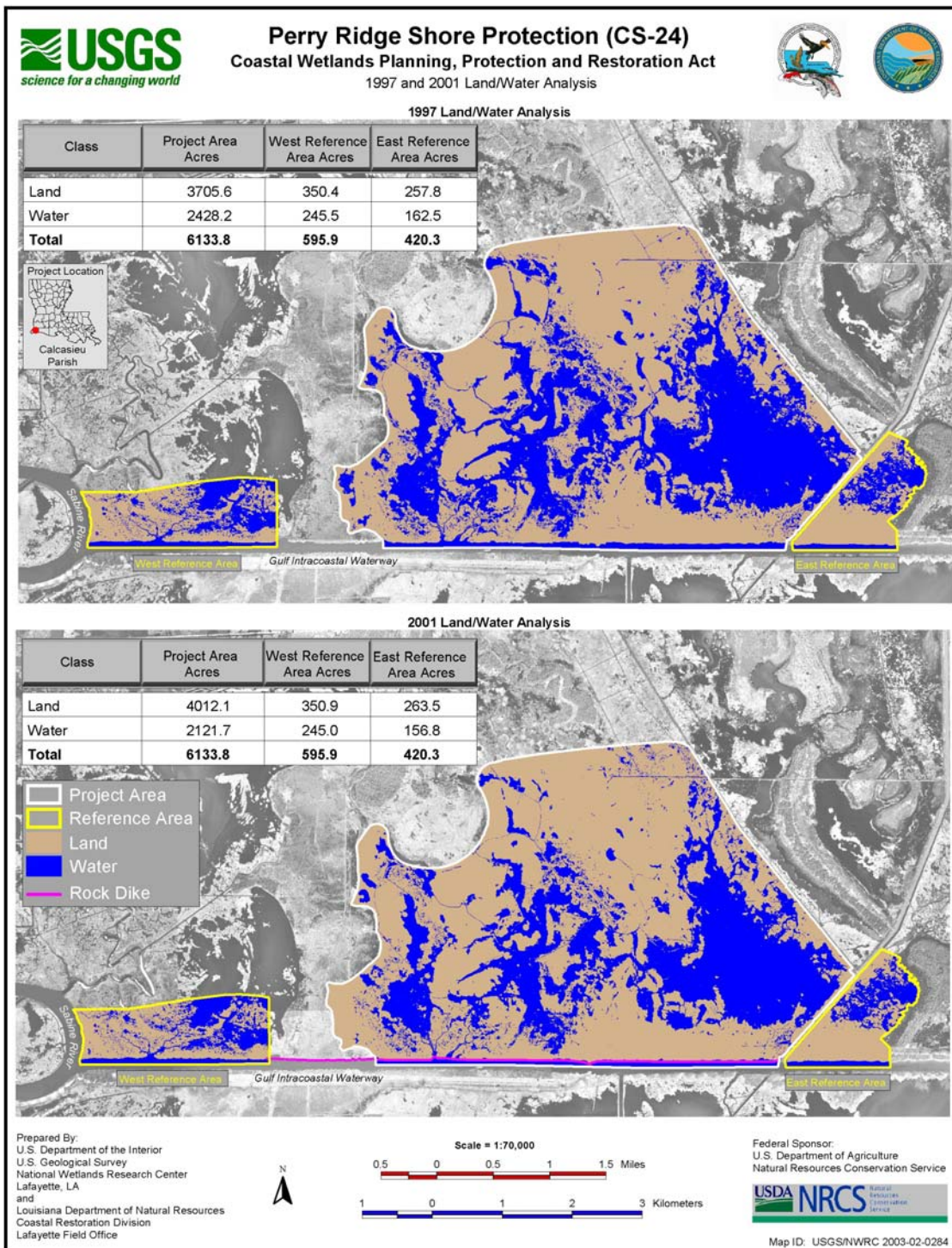


Figure 3. Pre- and post-construction land/water analysis of the Perry Ridge Shore Protection (CS-24) project.

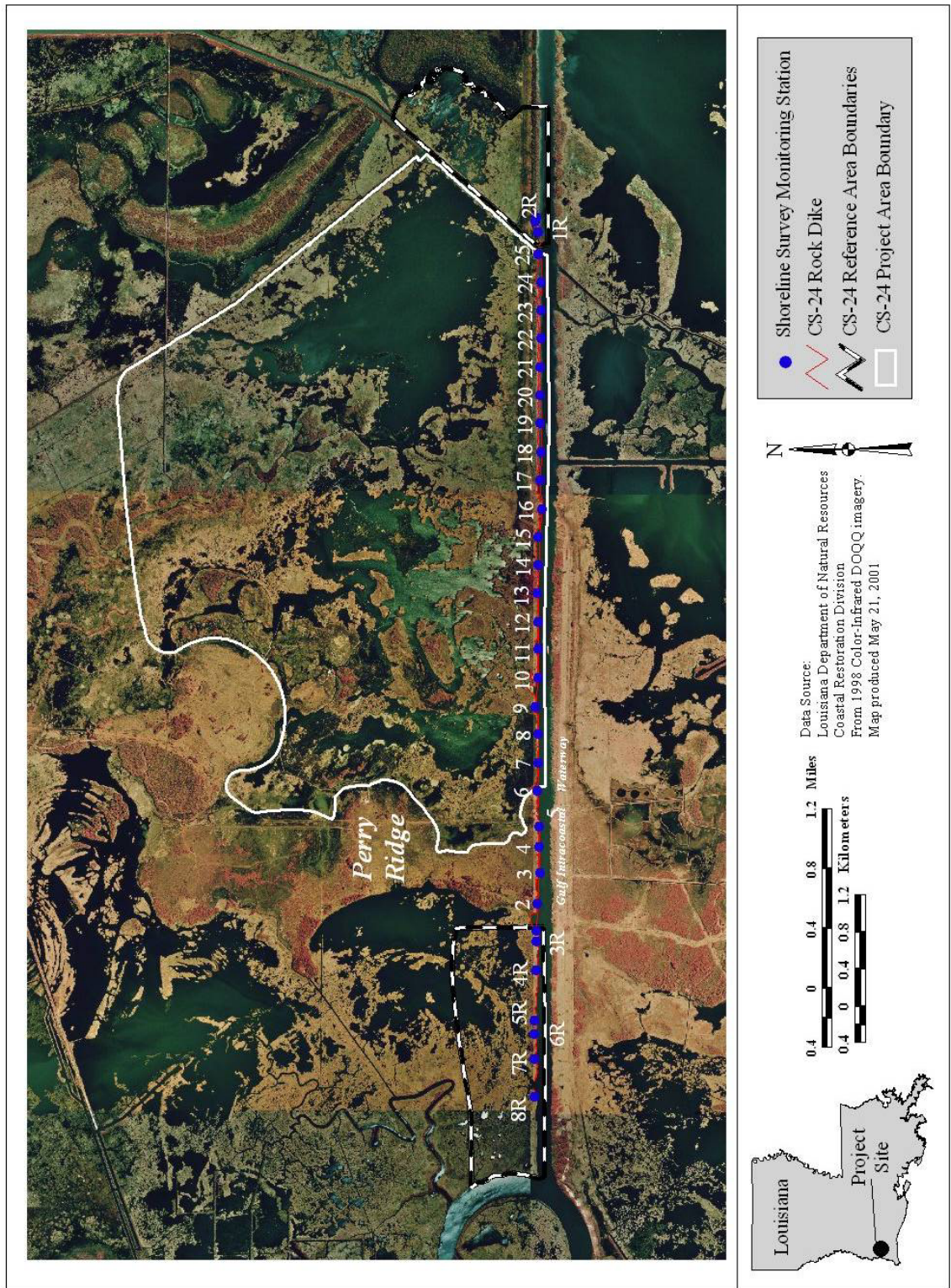


Figure 4. Perry Ridge Shore Protection (CS-24) shoreline marker station locations.

Table 1. Shoreline measurements within the CS-24 project area and reference areas for July 2002 and 2004.

Shoreline Marker Data							
Project Number	Station #	Group	Distance to Vegetated Edge (ft)				
				2002		2004	
C/S-24	CS24-01	Project		8.10		7.6	
C/S-24	CS24-02	Project		25.70		27.2	
C/S-24	CS24-03	Project		22.40		22.3	
C/S-24	CS24-04	Project		15.70		10.8	
C/S-24	CS24-05	Project		47.50		46.6	
C/S-24	CS24-06	Project		53.40		48.6	
C/S-24	CS24-07	Project		8.10		6	
C/S-24	CS24-08	Project		28.20		43.9	
C/S-24	CS24-09	Project		41.80		36.6	
C/S-24	CS24-10	Project		241.60		235.5	
C/S-24	CS24-11	Project		15.80		12.4	
C/S-24	CS24-12	Project		7.70		9.8	
C/S-24	CS24-13	Project		26.00		26.6	
C/S-24	CS24-14	Project		23.30		18	
C/S-24	CS24-15	Project		93.90		92.1	
C/S-24	CS24-16	Project		103.20		101.1	
C/S-24	CS24-17	Project		120.60		115.5	
C/S-24	CS24-18	Project		76.60		75.3	
C/S-24	CS24-19	Project		60.40		52.1	
C/S-24	CS24-20	Project		69.20		67.3	
C/S-24	CS24-21	Project		49.20		7.5	
C/S-24	CS24-22	Project		89.40		88.4	
C/S-24	CS24-23	Project		57.50		59	
C/S-24	CS24-24	Project		119.30		118.6	
C/S-24	CS24-25	Project		43.30		38.7	
C/S-24	CS24-01R	Reference		43.90		40.1	
C/S-24	CS24-02R	Reference		39.70		38.5	
C/S-24	CS24-09R	Reference		41.60		31	
Distances were measured from settlement plates to vegetated edge for project area and to vegetated edge from survey hub for reference area by direct (tape) measurement.							



CS-24 Perry Ridge Shoreline Position Change 2002-2004

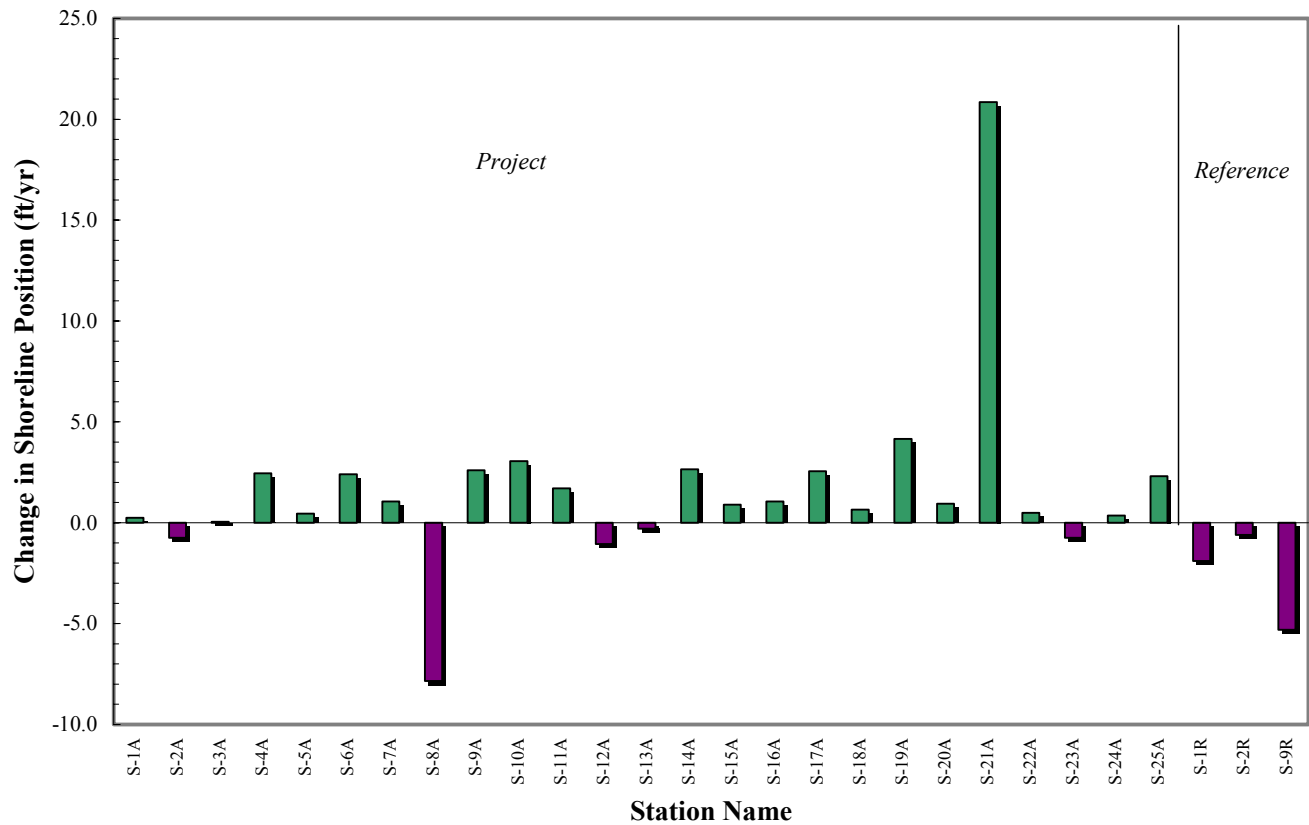


Figure 5. Shoreline position change (ft/yr) in the Perry Ridge Shore Protection (CS-24) project area for 2002-2004.



V. Conclusions

a. Project Effectiveness

The 2004 shoreline survey indicates that the Perry Ridge Shore Protection (CS-24) Project has been effective at preventing shoreline erosion. The average rate of gain over all 25 project stations was 1.6 ft/yr while the shoreline in the reference area stations continued to retreat at a rate of 0.8 ft/yr. Visual observation indicates vertical accretion of the wetland area at many locations between the foreshore rock dike and the shoreline. The next shoreline marker survey is scheduled for the fall of 2007.

b. Recommended Improvements

At this time, the project appears to be functioning properly. No improvements are currently being recommended.

c. Lessons Learned

Based on multiple O & M Inspections, the foreshore rock dike has proven to be effective in reducing shoreline erosion along the GIWW, while experiencing no deterioration and requiring no recommended maintenance.



VI. REFERENCES

- Chabreck, R. H. and G. Linscombe 1978 and 1988. Vegetation type map of the Louisiana coastal marshes. Louisiana Department of Wildlife and Fisheries, New Orleans. Scale 1:62,500.
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- Steyer, G. D., R. C. Raynie, D. L. Steller, D. Fuller, and E. Swenson 1995, revised 2000. Quality management plan for Coastal Wetlands Planning, Protection, and Restoration Act monitoring plan. Open-file series 95-01. Baton Rouge: Louisiana Department of Natural Resources, Coastal Restoration Division.
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- U.S. Department of Agriculture, Natural Resources Conservation Service (USDA/NRCS) 1996. Environmental Assessment, USDA-NRCS, Calcasieu Parish, Louisiana. 18 +pp.



Appendix A
(Inspection Photographs)



View looking west from the Vinton Drainage Canal





Beginning of the project at the Vinton Drainage Canal

Appendix B

15



(Three-Year Budget Projection)

PERRY RIDGE SP / CS24 / PPL4

Three-Year Operations & Maintenance Budgets 07/01/2005 - 06/30/08

Project Manager

O & M Manager

Federal Sponsor

Prepared By

NRCS

	2005/2006	2006/2007	2007/2008
Maintenance Inspection	\$ 4,955.00	\$ 5,119.00	\$ 5,288.00
Structure Operation	\$ -	\$ -	\$ -
Administration	\$ -		\$ -

Maintenance/Rehabilitation

05/06 Description:

<i>E&D</i>	\$ -
<i>Construction</i>	\$ -
<i>Construction Oversight</i>	\$ -
<i>Sub Total - Maint. And Rehab.</i>	\$ -

06/07 Description

<i>E&D</i>	
<i>Construction</i>	
<i>Construction Oversight</i>	
<i>Sub Total - Maint. And Rehab.</i>	\$ -

07/08 Description:

<i>E&D</i>	\$ -
<i>Construction</i>	\$ -
<i>Construction Oversight</i>	\$ -
<i>Sub Total - Maint. And Rehab.</i>	\$ -

	2005/2006	2006/2007	2007/2008
<u>Total O&M Budgets</u>	\$ 4,955.00	\$ 5,119.00	\$ 5,288.00



OPERATION AND MAINTENANCE BUDGET 07/01/2005-06/30/2006
PERRY RIDGE SHORE PROTECTION/CS-24/PPL4

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$4,955.00	\$4,955.00
General Structure Maintenance	LUMP	1	\$0.00	\$0.00
Engineering and Design	LUMP	1	\$0.00	\$0.00
Operations Contract	LUMP	1	\$0.00	\$0.00
Construction Oversight	LUMP	1	\$0.00	\$0.00

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	\$0.00	\$0.00
FEDERAL SPONSER Admin.	LUMP	0	\$0.00	\$0.00
SURVEY Admin.	LUMP	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL ADMINISTRATION COSTS:				\$0.00

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	\$0.00	\$0.00	
Staff Gauge / Recorders	EACH	0	\$0.00	\$0.00	
Marsh Elevation / Topography	LUMP	0	\$0.00	\$0.00	
TBM Installation	EACH	0	\$0.00	\$0.00	
OTHER					\$0.00
TOTAL SURVEY COSTS:					\$0.00

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	\$0.00	\$0.00	
OTHER					\$0.00
TOTAL GEOTECHNICAL COSTS:					\$0.00

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
Filter Cloth / Geogrid Fabric	SQ YD	0	\$0.00	\$0.00	
Navigation Aid	EACH	0	\$0.00	\$0.00	
Signage	EACH	0	\$0.00	\$0.00	
General Excavation / Fill	CU YD	0	\$0.00	\$0.00	
Dredging	CU YD	0	\$0.00	\$0.00	
Sheet Piles (Lin Ft or Sq Yds)		0	\$0.00	\$0.00	
Timber Piles (each or lump sum)		0	\$0.00	\$0.00	
Timber Members (each or lump sum)		0	\$0.00	\$0.00	
Hardware	LUMP	1	\$0.00	\$0.00	
Materials	LUMP	1	\$0.00	\$0.00	
Mob / Demob	LUMP	1	\$0.00	\$0.00	
Contingency	LUMP	1	\$0.00	\$0.00	
General Structure Maintenance	LUMP	1	\$0.00	\$0.00	
OTHER			\$0.00	\$0.00	
OTHER			\$0.00	\$0.00	
OTHER			\$0.00	\$0.00	
TOTAL CONSTRUCTION COSTS:					\$0.00

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **\$4,955.00**



OPERATION AND MAINTENANCE BUDGET 07/01/2006-06/30/2007
PERRY RIDGE SHORE PROTECTION/CS-24/PPL4

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$5,119.00	\$5,119.00
General Structure Maintenance	LUMP	1	\$0.00	\$0.00
Engineering and Design	LUMP	1	\$0.00	\$0.00
Operations Contract	LUMP	1	\$0.00	\$0.00
Construction Oversight	LUMP	1	\$0.00	\$0.00

ADMINISTRATION

LDNR / CRD Admin.	LUMP	0	\$0.00	\$0.00
FEDERAL SPONSER Admin.	LUMP	0	\$0.00	\$0.00
SURVEY Admin.	LUMP	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL ADMINISTRATION COSTS:				\$0.00

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:				
Secondary Monument	EACH	0	\$0.00	\$0.00
Staff Gauge / Recorders	EACH	0	\$0.00	\$0.00
Marsh Elevation / Topography	LUMP	0	\$0.00	\$0.00
TBM Installation	EACH	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL SURVEY COSTS:				\$0.00

GEOTECHNICAL

GEOTECH DESCRIPTION:				
Borings	EACH	0	\$0.00	\$0.00
OTHER				\$0.00
TOTAL GEOTECHNICAL COSTS:				\$0.00

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE	
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
	0	0.0	0	\$0.00	\$0.00
Filter Cloth / Geogrid Fabric	SQ YD	0		\$0.00	\$0.00
Navigation Aid	EACH	0		\$0.00	\$0.00
Signage	EACH	0		\$0.00	\$0.00
General Excavation / Fill	CU YD	0		\$0.00	\$0.00
Dredging	CU YD	0		\$0.00	\$0.00
Sheet Piles (Lin Ft or Sq Yds)		0		\$0.00	\$0.00
Timber Piles (each or lump sum)		0		\$0.00	\$0.00
Timber Members (each or lump sum)		0		\$0.00	\$0.00
Hardware	LUMP	1		\$0.00	\$0.00
Materials	LUMP	1		\$0.00	\$0.00
Mob / Demob	LUMP	1		\$0.00	\$0.00
Contingency	LUMP	1		\$0.00	\$0.00
General Structure Maintenance	LUMP	1		\$0.00	\$0.00
OTHER				\$0.00	\$0.00
OTHER				\$0.00	\$0.00
OTHER				\$0.00	\$0.00
TOTAL CONSTRUCTION COSTS:					\$0.00

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **\$5,119.00**



OPERATION AND MAINTENANCE BUDGET 07/01/2007-06/30/2008
PERRY RIDGE SHORE PROTECTION/CS-24/PPL4

DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	ESTIMATED TOTAL
O&M Inspection and Report	EACH	1	\$5,288.00	\$5,288.00
General Structure Maintenance	LUMP	1	\$0.00	\$0.00
Engineering and Design	LUMP	1	\$0.00	\$0.00
Operations Contract	LUMP	1	\$0.00	\$0.00
Construction Oversight	LUMP	1	\$0.00	\$0.00

ADMINISTRATION

LDNR / CRD Admin.	LUMP	1	\$0.00	\$0.00
FEDERAL SPONSER Admin.	LUMP	1	\$0.00	\$0.00
SURVEY Admin.	LUMP	1	\$0.00	\$0.00
OTHER				\$0.00
TOTAL ADMINISTRATION COSTS:				\$0.00

MAINTENANCE / CONSTRUCTION

SURVEY

SURVEY DESCRIPTION:					
Secondary Monument	EACH	0	\$0.00	\$0.00	
Staff Gauge / Recorders	EACH	0	\$0.00	\$0.00	
Marsh Elevation / Topography	LUMP	0	\$0.00	\$0.00	
TBM Installation	EACH	0	\$0.00	\$0.00	
OTHER				\$0.00	
TOTAL SURVEY COSTS:				\$0.00	

GEOTECHNICAL

GEOTECH DESCRIPTION:					
Borings	EACH	0	\$0.00	\$0.00	
OTHER				\$0.00	
TOTAL GEOTECHNICAL COSTS:				\$0.00	

CONSTRUCTION

CONSTRUCTION DESCRIPTION:					
	Rip Rap	LIN FT	TON / FT	TONS	UNIT PRICE
		0	0.0	0	\$0.00
		0	0.0	0	\$0.00
		0	0.0	0	\$0.00
	Filter Cloth / Geogrid Fabric		SQ YD	0	\$0.00
	Navigation Aid		EACH	0	\$0.00
	Signage		EACH	0	\$0.00
	General Excavation / Fill		CU YD	0	\$0.00
	Dredging		CU YD	0	\$0.00
	Sheet Piles (Lin Ft or Sq Yds)			0	\$0.00
	Timber Piles (each or lump sum)			0	\$0.00
	Timber Members (each or lump sum)			0	\$0.00
	Hardware	LUMP	1	\$0.00	\$0.00
	Materials	LUMP	1	\$0.00	\$0.00
	Mob / Demob	LUMP	1	\$0.00	\$0.00
	Contingency	LUMP	1	\$0.00	\$0.00
	General Structure Maintenance	LUMP	1	\$0.00	\$0.00
	OTHER			\$0.00	\$0.00
	OTHER			\$0.00	\$0.00
	OTHER			\$0.00	\$0.00
TOTAL CONSTRUCTION COSTS:					\$0.00

TOTAL OPERATIONS AND MAINTENANCE BUDGET: **\$5,288.00**



